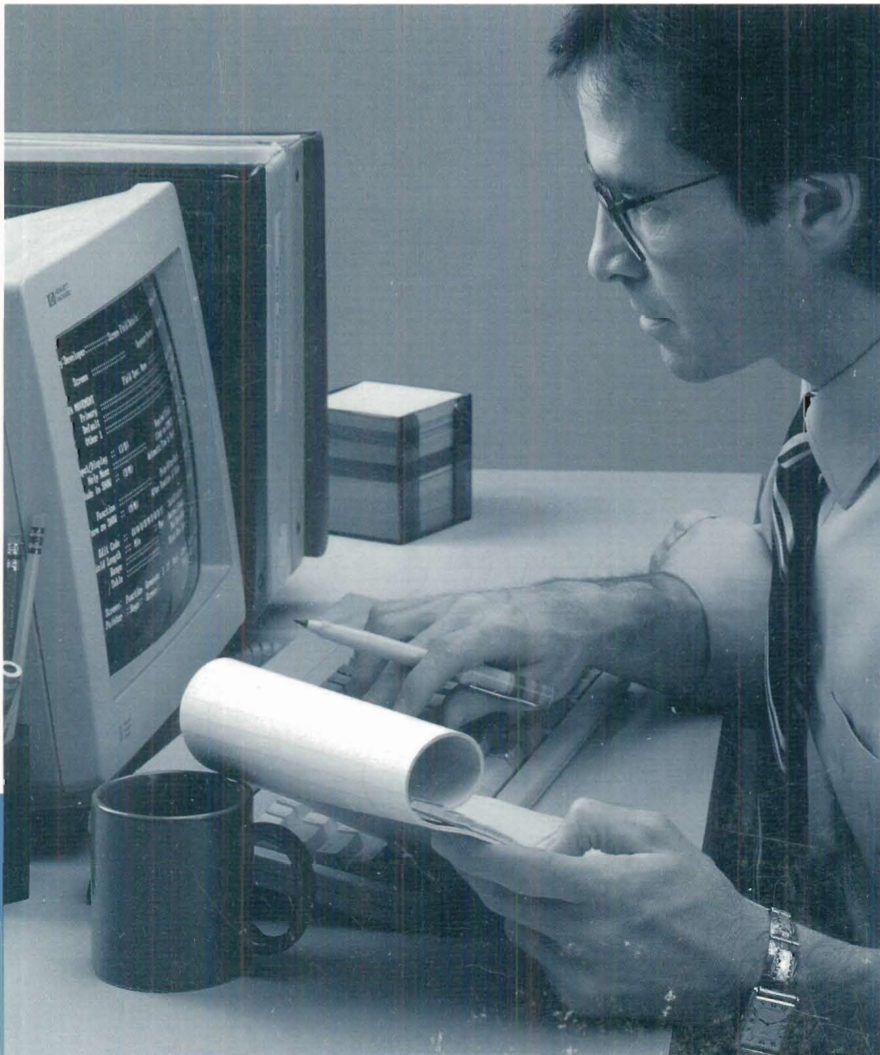


HP ALLBASE/4GL

**HP's Advanced
Fourth Generation Language**



Product Evaluation Guide

HP Computer Museum
www.hpmuseum.net

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About This Guide

This guide will help you to understand how HP ALLBASE/4GL can increase your productivity in application development. The guide explains the concepts of HP ALLBASE/4GL and gives some examples of its flexibility and ease of use.

The first few pages explain the features you should expect of a 4GL, and also the best uses for a 4GL. The core of the guide describes the way HP ALLBASE/4GL works by leading you through some of the facilities frequently used by software developers. The third section summarizes the advantages of choosing HP ALLBASE/4GL. The guide finishes with a brief description of the ALLBASE Relational Environment—Hewlett-Packard's offering for the complete management of information stored in relational databases.

What Is a 4GL?

The first, second, and third generations of computer languages can be defined as machine code (1st), assembler (2nd), and languages such as Fortran or COBOL (3rd). During these three generations, computer languages have evolved toward more fluent and powerful command sets. The productivity of programmers using COBOL (or any other 3GL), compared to the productivity of programmers using machine code, is many times greater. The increase in productivity when moving from a 3GL to a 4GL can be even more dramatic. With the first three generations of computer languages, programmers created applications by encoding a set of procedures. Fourth generation languages are the first non-procedural computer languages. With a non-procedural language, developers don't need to specify a step-by-step process: they simply describe the desired result. Fourth generation languages give you the computing power and flexibility to leap from procedural to non-procedural software development.

The 4GL Test

Many products are promoted as fourth generation languages. The following questions from independent authorities* will help you choose the best 4GL for you.

1. Does the product utilize a relational database?

✔ **HP ALLBASE/4GL** Yes. It interfaces directly with HP ALLBASE/SQL—the relational part of the HP ALLBASE database management system. HP ALLBASE/4GL also includes data managers for serial files and multi-key indexed files. Data security is ensured by transaction-based record locking and, in the event of a hard or soft crash, rollforward recovery in the HP ALLBASE/SQL database or HP ALLBASE/4GL indexed files. See pages 5, 6, 26, and 30.

■ **Other products**

2. Does the product use a central dictionary?

✔ **HP ALLBASE/4GL** Yes. HP ALLBASE/4GL stores definitions of all field specifications, screen messages, constants, variables, record layouts, etc. in a central dictionary. Any changes made to a dictionary definition are propagated throughout the screens, logic and record layouts at the press of a key. See pages 6, 8, 9, and 27.

■ **Other products**

*IDC Explains Fourth Generation Languages, in *Continuous Information Services*, a research memorandum prepared for IDC.

Major Characteristics of a 4th and 5th Generation Language, G.M. Nijssen, Professor of Computer Science, University of Queensland, Australia.

The Human Interface to 4GL, Hans van der Leeuw, a paper given at the HP3000 International Conference in Vienna in 1987.



3. Are there facilities for easy screen creation?

- ✓ **HP ALLBASE/4GL** Yes. The Module Builder facility, available from release B.01, automatically creates screens in accordance with the dictionary descriptions of specified tables or files. Screens created by Module Builder already include Add, Delete and Modify functions. The Screen Painter facility allows you to quickly create specialized data screens, menus and windows or to change the screens created by the Module Builder facility. See pages 7, 10-13, and 27.

■ **Other products**

4. Is the product easy to learn?

- ✓ **HP ALLBASE/4GL** Yes. HP ALLBASE/4GL is both easy to learn and easy to use. Menus, function keys, context sensitive help screens and screen forms with intuitive defaults and prompts combine to form a common-sense approach which enables the developer to learn and use the product quickly. This ease of use is also reflected in HP ALLBASE/4GL applications. See pages 28-29.

■ **Other Products**

5. Are applications portable?

- ✓ **HP ALLBASE/4GL** Yes. Applications are portable across HP-UX and MPE XL operating systems. This compatibility makes it possible to develop applications on one computer for a wide variety and scale of target systems. For example, an application developed on an HP 9000 Series 300 computer could be used on a Series 800, or a Series 900 HP 3000 computer. The reverse is also true. See page 27.

■ **Other products**

6. Does the product allow ad hoc data access?

- ✓ **HP ALLBASE/4GL** Yes. Pre-determined reports and regular queries are developed with the HP ALLBASE/4GL Reports facility. Ad hoc data access is provided by HP ALLBASE/QUERY, available as a companion product to facilitate delivery to end-users. Where both products are installed, HP ALLBASE/4GL (from release B.01) provides direct access to HP ALLBASE/QUERY. The same integration

is available to your HP ALLBASE/4GL applications. With HP ALLBASE/QUERY, novice users can display ad hoc queries or print reports within minutes. See pages 17-19, and 31.

■ Other products

7. Does the product have local language support?

✓ **HP ALLBASE/4GL** Yes. In HP ALLBASE/4GL it is possible to create an application where end-users choose the language in which they want messages to appear. Asian terminals and printers that recognize the HP-15 encoding system are also supported.

■ Other products

8. Is the product complete?

✓ **HP ALLBASE/4GL** Yes. HP ALLBASE/4GL includes everything you need for prototyping, creating, testing, running and maintaining applications within a single environment.

■ Other products

Flexibility With a 4GL

Because a true 4GL is non-procedural, your approach to development may change. Now, the major portion of your development time is likely to be the time spent designing your solution. Its implementation will be fast because in HP ALLBASE/4GL coding requirements are minimal.

In HP ALLBASE/4GL, both the structure of an application and your approach to its development can vary because of the free order in which the elements of an HP ALLBASE/4GL application can be created and linked. Screens can be created before functions, functions before records, records before screens and vice versa. They can be linked in any order via menu trees, function keys or logic structures. This flexibility enables you to vary your applications between ones which offer choices to end-users through function keys and menu items, and ones which systematically present end-users with their next task.

The same flexibility allows you to experiment with development processes such as prototyping. Before investing in logic development, you can sit at the keyboard with your end-user and prototype screens. The Screen Painter in HP ALLBASE/4GL provides highly interactive visual programming. This makes it quick and easy to design and create your own screens, or tailor those created automatically with the Module Builder. You can create

- screen fields by calling on dictionary definitions
- data sensitive fields
- line drawings for forms
- automatic date and time headers
- windows and scrolling areas

Since end-users can see and approve the interface so early in the development cycle, you provide the right solution the first time.

The simplicity and speed of HP ALLBASE/4GL helps you to create applications faster. The power and flexibility of HP ALLBASE/4GL provides you with a software development tool suitable for a wide variety of applications.

What Is HP ALLBASE/4GL Best Suited For?

From order processing to database marketing, from customer billing to general accounting, from instrument monitoring to providing a friendly user interface for data acquisition equipment, the diversity of applications that can be developed using HP ALLBASE/4GL is impressive.

Extensive evaluations by Fortune 100 companies have led to the following conclusions.

- The user interface to HP ALLBASE/4GL and the facilities for providing easy-to-use applications are outstanding.
- The external interface to other software is smooth.
- HP ALLBASE/4GL is powerful for prototyping.
- HP ALLBASE/4GL is an excellent 4GL for creating complex applications.
- The interface to HP ALLBASE/SQL is fast and efficient.

Its tight integration to HP ALLBASE/SQL makes HP ALLBASE/4GL suitable for data- and transaction-based applications. Complex applications can be developed entirely in HP ALLBASE/4GL to look good and perform well. HP ALLBASE/4GL is also suited to those solutions which include a combination of highly specialized software and hardware (for example, chemical analysis software linked to a gas chromatograph). For such compound solutions, HP ALLBASE/4GL can be used to create a single, easy-to-use human interface.

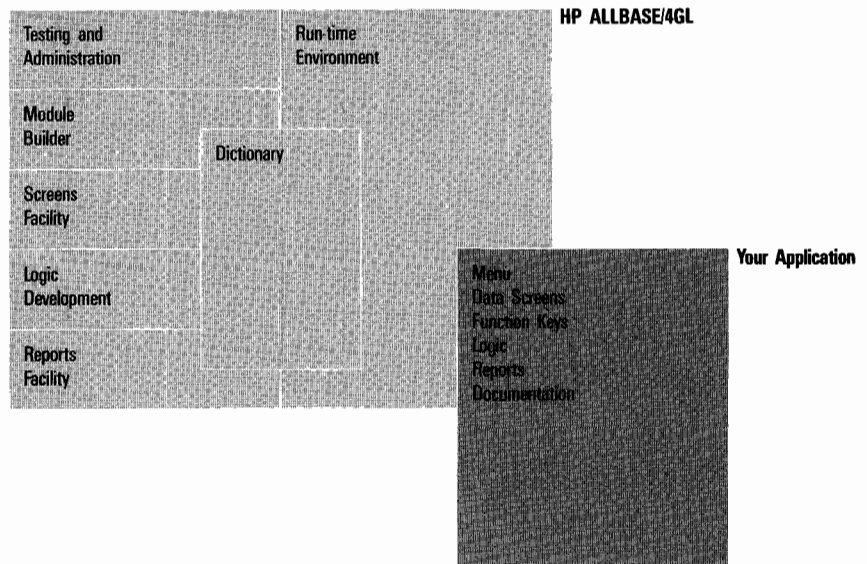
Chapter 2

How HP ALLBASE/4GL Works

HP ALLBASE/4GL is an integrated environment containing facilities for defining, testing and maintaining applications. The facilities combine to contribute to the total solution in a variety of ways. For example, dictionary definitions are accessed from the Screens facility to paint fields, from the Logic facility to execute data storage commands, and they also directly create tables in the database.

The next few pages describe ways a software developer might use some of the facilities in HP ALLBASE/4GL when creating or modifying applications.

Figure 1. An Integrated Development Environment.



Designing and Prototyping the Application

The best applications are created by developers who first analyze their requirements and create a data model and working prototype. With HP ALLBASE/4GL, creating a data model is doubly productive because you can enter definitions of variables, fields, tables, etc. directly into the Dictionary. You can then use the Module Builder and Screens facility to create prototypes that will be fully utilized in the completed application.

Using the Screen Painter, you can sit with your clients and create the end-user interface, that is, the input/output screens, menus and report start-up screens. It is at this point, before any logic has been created, that your client may recognize necessary changes or additions.

The Module Builder automatically creates a module for any predefined file or SQL table which you name in the Module Builder facility. A module consists of a screen, a logic structure to drive the screen, and other logic structures to add, delete, and modify data. Modules can be used to show your client (or end-users) how the completed application will operate. Often it is not until data is entered and displayed on the screen that the significance of certain features can be realized. The screen and logic structures in a module can be modified to suit a client's specific requirements in the same way as any developed HP ALLBASE/4GL items.

By prototyping the application with the user, you can be assured that your design is correct. And by creating your prototype you have also completed a significant portion of your development tasks. You can quickly expand a prototype into a finished application by modifying or adding specialized logic structures, painting any remaining screens, creating the predetermined reports, and testing the application. Applications are tested within the integrated environment of HP ALLBASE/4GL with the Application Testing facility.

Building a Dictionary

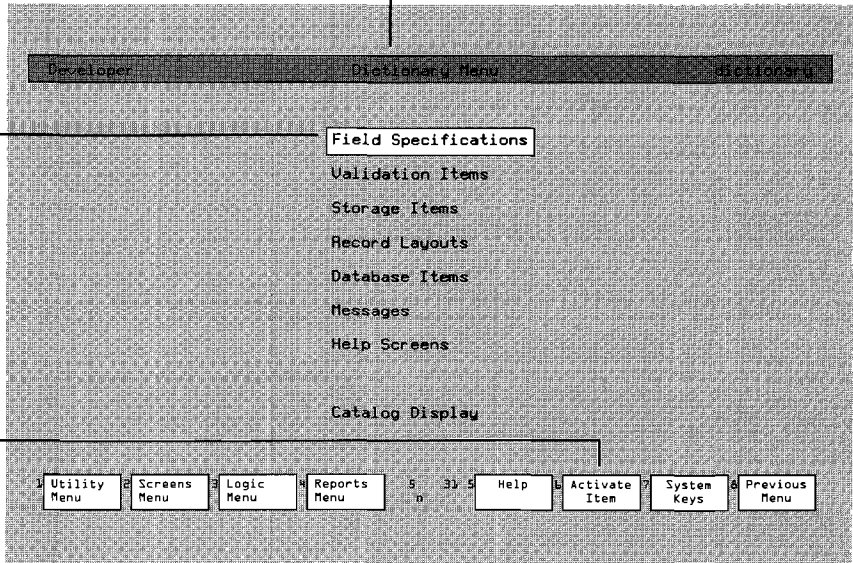
The dictionary speeds up development and reduces maintenance time. Any changes made to a definition are propagated throughout screens, logic and record layouts at the press of a key. The dictionary is transparently accessed from other parts of HP ALLBASE/4GL to validate input, paint screen fields, calculate items, determine index fields, display messages and so on.

Example: To define a field you can do the following.

The Dictionary menu is called from the main menu of HP ALLBASE/4GL.

Select this menu item.

Press this key or RETURN to display the Field Specifications screen.



Entering the field name displays any existing specification for change, or begins a new entry.

The field size will be available to screens, reports or record layouts. Repeating fields are also available.

These specifications replace coding. Character type and other specified validation will be applied automatically.

A help screen with this name will be attached to this field.

The name entered here will appear on automatic screens using this field.

Documentation simplifies maintenance.

Press this key to store the definition in the Dictionary.

The screenshot shows a 'Field Specifications' window with the following fields and values:

- Field Spec. Name: Secured (Y/N)
- Field Length: Repeating Times
- Minimum Entry Length:
- Edit Code: (W/A/U/K/N/S/Q/D/T)
- Justification: (L/R/C/N)
- Decimal Places:
- Validation: Range Table (Y/N)
- Help Name:
- Description: This field is a column in the prds table
- Last Modification: Date Time

At the bottom, a menu bar contains: Records Menu, Ranges, Tables, Database Items, Help, Commit Data, System Keys, Previous Menu.

You can define fields which can be accessed from anywhere in the application simply by filling in the Field Specifications screen. For each field you may also nominate a range or table of valid values, link the field with a help message or protect its definition against unauthorized modification simply by choosing an option or typing a name at the appropriate prompt.

You can define any of the other elements on the dictionary menu in a similar manner. After the required record layouts, tables, messages, storage and validation items are defined, you can use these definitions to speed up the creation and maintenance of screens, reports and logic.

Building a Module.

After you have defined a file or SQL table in the Dictionary, you can use the Module Builder facility to create automatically a fully operational table maintenance or inquiry module from your definition. A module includes a screen and the necessary logic to allow you to add, modify, delete and retrieve data from the defined table; and functions keys which display the last, first, previous and next record.

Example: The SQL table*, *prds*, has been defined in the dictionary to contain fields for the product tracking portion of the manufacturing application - *mfgsys*. To create a maintenance module for this table you fill in one screen form.

Call the Module Builder from the main menu of HP ALLBASE/4GL.

Enter a suitable name for the module.

Name the table you have defined and accept the remaining defaults provided from the dictionary. Cross-referencing other tables is also possible.

Press this key to create the module.

The screenshot shows the 'Module Builder' interface. At the top, it says 'Developer Module Builder module builder'. Below this, there are several input fields: 'Module Name' with the value 'prd_mnt', 'Type' with '(I/M)', 'Main Access: File' with 'wide', 'Record' with 'prds', and 'Index' with 'one'. There is also a checkbox for 'Include All Fields' which is checked and labeled '(Y/N)'. At the bottom of the screen, there is a prompt: 'Press either [Specify Details] or [Generate Module].' followed by the number '(14852)'. Below the prompt is a menu bar with several options: 'Specify Details' (F1), 'Generate Module' (F2), 'Help' (F3), 'System Keys' (F4), and 'Previous Menu' (F5).

*If you are not familiar with the concept of relational tables, please see page 30.

This screen was automatically created from the previous form.

You can add data to the prds table immediately.

Functions to view the next, previous, first and last records were also created automatically.

To add another row, check to see you're in add mode and enter a new product number.

Press this key to store the data.

The screenshot shows a terminal window titled "Prds Maintenance Screen" with a header bar containing "shpsys", "Prds Maintenance Screen", and "mb_prd_mnt". The main area displays the following data:

Product Number	9664-9000A
Description	ac/dc stereo radio/cassette recorder
Product Line	PL61
Account Code	000
Unit Measure	01
Country Origin	004
Standard Hours	0.00
Price (fpp)	129.00
(Std.Cost)	129.00
Duty (acc)	48.00
Customs Description	EZDX Walkman Cassette Players
Modified:	12/11/90
at:	11:38:21
By User:	HBP

At the bottom, a control bar contains the following buttons: 1 Mode (Add), 2 Previous Record, 3 Next Record, 4 More Keys, 5 n, 6 System Keys, 7 Commit Data, 8 Help, 9 Previous Menu.

Painting the Screens

With the speed and simplicity of the Screen Painter it becomes practical to sit with an end-user and create or modify screens until the way information is displayed matches the user's conceptual framework.

The use of dictionary definitions contributes to the speed of the Screen Painter. For example, to create a screen field for data input, simply place the cursor in the appropriate position, press the function key labeled "Input Field" and type in the name of the field as you defined it in the dictionary. A highlighted field of the defined size will then appear. All data entered into that field will be validated and processed as specified in the dictionary. This is not only productive but also prevents data corruption in the completed application by detecting and reporting attempts to enter invalid data as they occur.

The ability to insert items such as the date, time, calculated items, and title fields, simply by pressing function keys, adds to productivity. The line drawing capabilities and screen editing facilities (move, copy, delete, overlay, etc.) help create elegant screens which can be changed or reproduced quickly.

The Screens facility also includes screen forms for attaching function keys and entering screen field details. Without writing any code, you can designate that a data field be justified or centered, have all entries appear in uppercase, be a display only field, store data, be linked to a help screen, call a function, and more. You achieve all this simply by selecting options from the Screen Field Details screen.

Example: The automatic screen just created has been modified with the Screen Painter to allow a window to be displayed for defining product components (a simple bill of materials).

The layout of the automatic screen has been modified in the Screen Painter to suit user specifications and leave space for a new window.

These input fields have been changed to output fields and now use the system communication areas to automatically update values.

Defining sections of the screen (blocks) speeds up modification.

All screen items and blocks can be moved, copied or deleted.

PRODUCT MAINTENANCE

Product Number [] Product Line []

Description []

Account Code []

Unit Measure [] Customs Description []

Country Origin [] Standard Hours [] min

Price (fbp) [] (Std.cost) []

Duty (acc) []

Modified: 2/11/90
at: 11:42:36
By user: MBP

Move Copy End Function Delete Column Mode Begin Block End Block Main Keys

Adding the Logic

We've seen that significant data-transaction applications can be created simply by using the Screens facility and Module Builder within HP ALLBASE/4GL. To further extend the functionality of your application you can use the Logic facility to create processes, functions, SQL logic blocks or decision tables. Decision tables help you to concisely define complex conditional statements.

In HP ALLBASE/4GL all logic structures are created using fourth generation techniques. The use of a system editor (although possible) is unnecessary. Screen forms which indicate the parameters for each logic command reduce syntax errors. Logic can be tested within HP ALLBASE/4GL at any time during development.

The power contained in HP ALLBASE/4GL logic commands is demonstrated in the following example.

Example : The following example taken from *mfgsys*, allows end-users to view the component parts of a product. In *mfgsys*, the data structure includes the following tables:

Table 1. All products and components are stored in the prds table. Products can also be components of some higher level product. A section of the prds table is shown below:

prds table

pno	acod	pl	fbp
....	

Table 2. The simple bom table lists quantity and both part numbers for each parent-child relationship. Because relational technology deals with sets of data, this allows "many to many" relationships between products and components.

bom table

parent	child	qty
....

To manipulate the data in these tables, the developer has created an SQL logic block called *select_bom*. This takes a product (parent) part number from the data screen field, looks up all its component (child) part numbers and quantities in the *bom* table, and collects their descriptions from the *prd* table. The data from the two tables is collated into a select list (an SQL view) called *bomlist*. All of this is achieved in a single, industry-standard SQL statement.

You will see the SQL logic block, *select_bom*, called in the following example. Then the select list, *bomlist*, is treated exactly as if it were a real data file.

This function is invoked by pressing the "Bill of Mtl's" function key on the Warehouse Control screen.

Text literals are moved to the screen buffer and displayed in the headline field. This technique allows data-sensitive narratives to be displayed.

Data from tables is read to the file buffer. The second statement directs error handling.

The SCROLL command displays rows of any data items or text literals in a predefined screen area. Previously displayed lines are scrolled automatically.

Powerful message types simplify handling of unexpected conditions.

```

Developer      Function Details      function_detail
Function       scroll_bom
1 MOVE "Components Qty Description" S-headline,whse_ctl
2 SHOW *REFRESH
3 SQL select_bom
4 FILE *NEXT bomlist ; ENTER 7
5 SCROLL F-pno.bomlist " F-qty.bomlist " F-desc.bomlist
6 ENTER 4
7 IF *IOSTATUS <> C-eof THEN MESSAGE file_err
8 SCROLL "***You have reached the end of the bill of materials.***"
9 EXIT
10
Step Number  Action  (A/C/D/I/R/L/S)  Command
Command Help  Function Header  Process Detail  Generate Function  System Keys  Commit Data  Help  Previous Menu

```

With this screen, the user can review order and inventory levels for a product, as well as its bill of materials.

The end-user enters the product number and presses Commit Data.

An after function attached to the first field displays this information.

mfgsus WAREHOUSE CONTROL whse ctt

Product Number 9664-9000A

Description ac/dc portable stereo radio/cassette recorder

Account Code 888 Standard Hours .20min Unit Measure 01

Customs Description EZOK Walkman Cassette Player

Components	Qty	Description
9664-9000	1	EZOK Walkman Cassette Player
9664-8700A	1	EZOK Lightweight Headphones
9664-9724	1	AC/DC Power Converter
9664-9310	1	instructions pamphlet, guarantee
9664-9100A	1	packaging kit

You have reached the end of the bill of materials.

Orders Bill of Mtl's Inv. Levels Print 3 1/2 Help Commit Data More Keys Previous Menu

Pressing this key calls the scroll_bom function and displays the bill of materials.

Function keys can be nested.

In HP ALLBASE/4GL, coding is minimized by screen level processing and concise logic commands. The Module Builder further increases your productivity by automatically creating logic structures that add, modify, retrieve and delete data. All logic structures can be modified at any time by using the screen forms in the Logic facility.

Creating Reports

To include comprehensive reports in your application you use the Reports facility. To enable the end-user to create ad hoc queries and reports, the HP ALLBASE/QUERY product is also available (see page 31).

With the Reports facility, by filling in screen forms you can

- specify up to 99 criteria for selecting records on which the report will be based
- define functions to perform alternative record selections
- use up to eight fields to sort records from the primary file in descending or ascending order
- make full use of the HP ALLBASE/4GL Logic facility to process and analyze data in all manner of complex relations

The Reports facility also includes the Report Painter. Like the Screen Painter, the Report Painter gives you complete freedom of presentation style and allows you to use dictionary definitions to paint fields.

The Reports facility enables you to print reports to any one of four system printers, and it can automatically select special stationery for printing invoices, questionnaires, standard letters, labels, etc. To make things simple, flexible and more productive for the end-user, you can also specify a range of possible search criteria to be displayed for selection on a report start-up screen.



Example: In the *mfgsys* application, the *All_Customers* report displays to the screen the name and address of every customer. To change this report to one which prints onto adhesive labels the name and address of customers who have purchased products 9655 to 9670, you can do the following.

Choosing the item "Record Selection" from the Reports Menu displays this screen.

This is the name *All_Customers* was copied to.

Name the field on which selection is based.

Enter the product number range.

Save your entries.

Press this key to display the Report Header screen.

The screenshot shows a terminal window titled "Developer Selection Criteria report_select". The main area contains the following fields and values:

- Report Name: Mail_by_pno
- After Selection Function: (empty)
- Secured: N (Y/N)
- Selection Number: 1
- Action: C (A/C/I/D)
- Link File[.record]: orders
- Field Spec. Name: pno
- Selection Criteria: Values FROM 9655-0000 TO 9670-9999

Below the main area, there is a table with the following content:

Number	Link	Field	'FROM' selection criteria
1		pno	9655-0000

At the bottom of the screen is a menu bar with the following items:

- 1 Header
- 2 Sorting
- 3 Line Header
- 4 Generate Report
- 5 Help
- 6 Commit Data
- 7 System Keys
- 8 Previous Menu

Change the printer from screen display (D) to any of four printers.

Entering the type of stationery ensures that if an attempt is made to print to a printer where the last report did not use LABELS, a screen warning will advise the user.

Check the number of characters per line so that the report will fit onto adhesive labels.

Press this key to save the changes.

Press this key to complete the development task.

Developer	Report Header	report_header									
Report Name	Mail_by_pno	Secured <input type="checkbox"/> (Y/N)									
Report Output File	mail	Index <input type="checkbox"/>									
Primary File[.Record]	orders										
Printer	1 (1/2/3/4/L/D)	Number of Copies <input type="checkbox"/>									
Type of Stationery	Labels										
Characters per Line (maximum)	86	Actual Page Size in Lines <input type="checkbox"/>									
Print Lines Used per Page	64	Formfeed Skip to Next Page <input type="checkbox"/> (Y/N)									
Delete Output File After Print	<input checked="" type="checkbox"/> (Y/N)										
Start of Report Function Name											
End of Report Function Name											
Description	All Customers This report prints the name and address of each customer who has purchased product 9655 to 9670 on adhesive labels.										
Last Modification:	Date 2/11/90	Time 11:50:47									
<table border="1"> <tr> <td>1 Sorting</td> <td>2 Record Select</td> <td>3 Line Header</td> <td>4 Generate Report</td> <td>5 36 5</td> <td>6 Help</td> <td>7 Commit Data</td> <td>8 System Keys</td> <td>9 Previous Menu</td> </tr> </table>			1 Sorting	2 Record Select	3 Line Header	4 Generate Report	5 36 5	6 Help	7 Commit Data	8 System Keys	9 Previous Menu
1 Sorting	2 Record Select	3 Line Header	4 Generate Report	5 36 5	6 Help	7 Commit Data	8 System Keys	9 Previous Menu			

Testing the Application

With the Application Testing facility the developer can test and easily modify applications. You can revise any part of the application simply by calling up the relevant definition screens and entering the modifications. You can enhance the application by adding extra details (perhaps change screen attributes or create display-only fields). You can then see your modifications working by selecting *Application Testing* again.

Select Application Testing from the main menu of HP ALLBASE/4GL to display the start-up screen in the current application.

You can test your modifications as they would appear to an end-user by proceeding through the menus.

To test an application item in isolation, type a slash (/). This brings up the additional prompt and field. Entering the prefix and report name and pressing Commit Data will run that item. This feature saves time when prototyping interactively.

mfgsus 0.15 developer MAIN MENU main

PRODUCTS Display Reports Maintenance

WORK ORDERS Display Reports Maintenance

CUST ORDERS Display Reports Maintenance

Please enter an action with the appropriate prefix. (13296)

R-Mail_by_pno

1 2 3 4 24 14 5 Help Commit Data System Keys Previous Menu

Documenting the Application

In HP ALLBASE/4GL you have the option of entering text in the comments field at the bottom of each header screen. Comments can be included in logic structures using the *NOTE* command. On-line user documentation in the form of context-sensitive help screens can be linked to any screen or screen field, and messages to warn, advise or query the user can be included in any logic structure.

Example: To create a help screen for the account code (acod) field, you can do the following.

This screen is selected from the Dictionary menu.

Enter the help screen name you specified in the dictionary or Screen Field Details form.

You can link any help screen to further help screens if you need to present more information than one screen can contain.

Type in the message and press this key to enter it in the dictionary.

The screenshot shows a terminal window with a header bar containing 'Developer', 'Help Screens', and 'helps'. Below the header, there are two input fields: 'Help Screen Name' with the value 'acod' and 'Next Help Screen' with the value 'acod_list'. The main content area contains the following text:

```

Enter an account location code.

An account location code is linked to each product made by
the company or any of its subsidiaries for the purpose of
inventory classification.

An account location code is a special number between 1 and
999999. If you are entering a new product and do not know
its account code, it may already be listed on the next help
screen. Please press "next page" to check.

If the correct code is not apparent please contact the
Accounts Manager, ext 965.

```

At the bottom of the screen is a navigation menu with the following items: 1 Field Specs., 2 Storage Menu, 3 Messages, 4 [blank], 5 Help, 6 Commit Data, 7 System Keys, 8 Previous Menu.



mfgsys		PRODUCT MAINTENANCE		mb_prd_mnt	
Product Number	9664-6700A	Product Line	PL61		
Description	wired headphones for products 9660 to 9670				
Account code	867				
Unit Measure	01	Customs Description	EZOR Lightweight Headphones		
Country origin	099	Standard Hours	0.10min		
Price (fbp)	8.50	(Std.cost)	8.50	Modified:	2/11/90
Duty (acc)	2.00			at:	11:51:43
				By user:	MBP

1 PREVIOUS PRODUCT	2 NEXT PRODUCT	3 ADD COMPS	4 MAIN MENU	5	6	7 Help	8 Commit Data	9 System Keys	0 Previous Menu
--------------------	----------------	-------------	-------------	---	---	--------	---------------	---------------	-----------------

Press this key when the cursor is on the Account Code field to display the message. Help is always context sensitive.

Enter an account location code.

An account location code is linked to each product made by the company or any of its subsidiaries for the purpose of inventory classification.

An account location code is a special number between 1 and 999999. If you are entering a new product and do not know its account code, it may already be listed on the next help screen. Please press "next page" to check.

If the correct code is not apparent please contact the Accounts Manager, ext 355.

1 Field Desc.	2	3	4 Screen Help	5	6	7 Next Page	8	9 Exit Help
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This key will display a general help message about the screen rather than a message about an individual field.

This key will display the dictionary description of the field.

This key is provided automatically when a Next Help Screen exists.

Delivering the Application

HP ALLBASE/4GL is available as a Developer Pack and a Run-Time Environment. The Developer Pack includes everything required to create and run applications. The Run-Time Environment includes everything the end-user needs to run (but not modify) developed applications. The Run-Time Environment is priced to facilitate bundling with developed applications.

Controlling the operation, configuration and security of the HP ALLBASE/4GL software environment is streamlined by the Administrator application within HP ALLBASE/4GL.

Among other things, system-wide definitions of dates, decimal formats, currency symbols and terminal highlighting for HP ALLBASE/4GL can be set in the Administrator application. This centralized method ensures consistency across all applications on the system.

For the person controlling the completed application (the system administrator), it provides a simple and productive way to assign user names, user passwords and application passwords by filling in blank spaces on formatted screens. It also enables the system administrator to invoke the training mode or secure any menu items within an application and so restrict access to confidential files.

Example: If you wanted to limit the access to the menu item *List Stocktake Products* in the *mfgsys* application, you could do the following.

From the Administrator application you can call up application screens in user security mode.

Simply place the cursor on the menu item you wish to secure.

Pressing this key presents the next screen.

You can also browse through the applications menu tree.

The screenshot shows a terminal window titled 'mfgsys' with a sub-header 'PRODUCT REPORTS' and a user identifier 'prg_rapa'. The main menu contains four options: 'List All Products in Detail', 'List All Products in Brief', 'List or View Selected Products', and 'List Stocktake Products'. Below the menu is a banner that reads 'NOTE: IN USER SECURITY MODE' with a user ID '(13405)'. At the bottom, there are several function keys: '1 Set User Security', '2', '3', '4', '5', '6 Activate Item', '7', and '8 Previous Menu'. Lines from the text on the left point to the 'List Stocktake Products' menu item, the 'Set User Security' key, and the bottom navigation area.

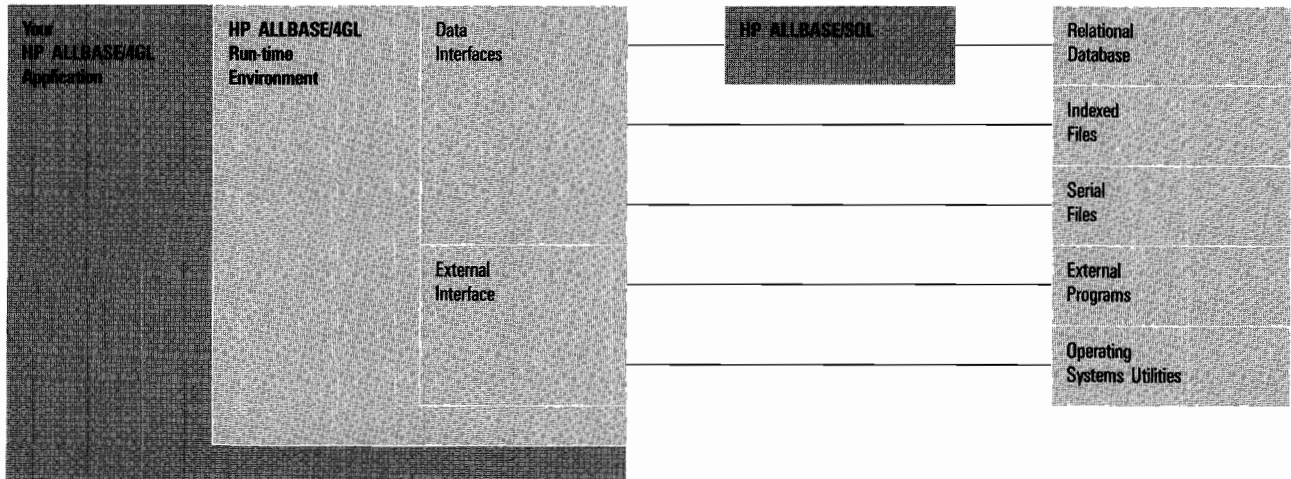
Enhancing Conventional Applications

Applications written in languages such as COBOL, Fortran, Pascal and C can be called from within HP ALLBASE/4GL using the logic command *EXTERNAL*. Naturally, parameters can be passed both ways.

This comprehensive external interface enables you to preserve your investment in existing software by incorporating old programs or specialized code written in conventional languages into HP ALLBASE/4GL applications. These programs can be greatly enhanced by tailoring user-input screens and reports, or by simplifying data-handling procedures. Development of new applications and the enhancement of old, results in a unified, simple to use, highly productive software system.

Furthermore, to provide maximum flexibility in accessing existing data, HP ALLBASE/4GL includes three data managers. Applications can access and update data stored in relational databases under HP ALLBASE/SQL, in multi-key indexed files or in serial files.

Figure 2. HP ALLBASE/4GL makes it possible to enhance and unify existing software and data.



What HP ALLBASE/4GL Can Do For You

In this competitive world, you need powerful applications quickly. Because HP ALLBASE/4GL is easy to use and fast to learn, you get a rapid return on investment. Your users get the applications they want the first time. And your developers get the benefits they need, too.

Productivity

HP ALLBASE/4GL substantially increases the productivity of the professional software developer.

The Dictionary eliminates repetition, the Module Builder reduces coding, the Screen Painter allows you to make significant changes quickly and the Reports facility provides powerful information management.

The clarity of the forms-based screens, the limited number of required screen fields and the intuitive defaults available throughout HP ALLBASE/4GL combine to save time during the development process.

Prototyping

With HP ALLBASE/4GL it becomes practical for the developer and end-user to sit together at the terminal and prototype the user interface. An operational prototype can be created either with the Module Builder facility or by filling in the Screen Field Details screen and adding the primary Logic structures. Designs that once took days or weeks can now be prototyped in hours. By ensuring that you deliver exactly what's required the first time, you eliminate costly and time-consuming rework.

Portability and Remote Database Access

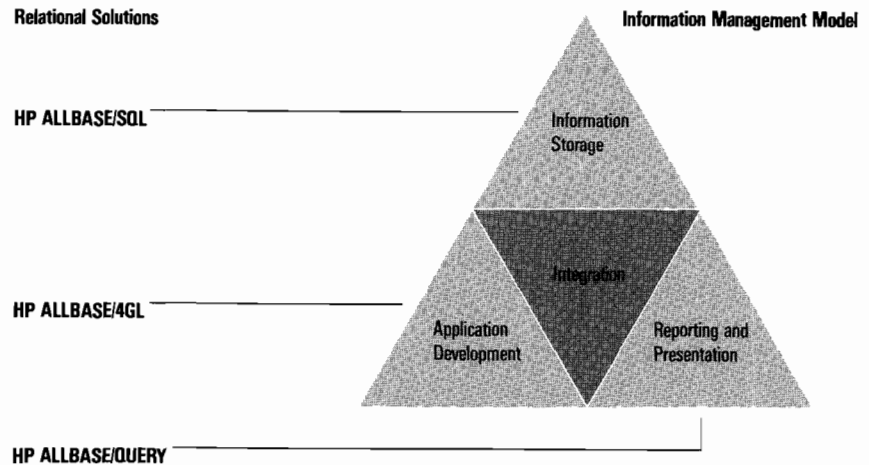
HP ALLBASE/4GL applications for MPE XL and HP-UX operating systems are fully compatible. For example, you can develop an application on an HP 9000 Model 330 computer and run it on a Model 950 HP 3000 computer or vice versa. Where data is stored under HP ALLBASE/SQL on a number of computers, an HP ALLBASE/4GL application can use the facilities of HP ALLBASE/NET to access and update remote data.

Performance

Applications created in HP ALLBASE/4GL perform exceptionally well. Standard benchmarks show that HP ALLBASE/4GL applications perform at a rate only marginally less than similar applications written in a 3GL such as Pascal. This is more than offset by the high productivity of development and the high quality user interface of the resulting applications. In addition, a relational solution offers the flexibility you need for decision support in today's business world.

The HP ALLBASE Relational Environment

Figure 3. HP's relational solutions to your Information Management needs.



The HP ALLBASE Relational Environment is Hewlett-Packard's software development and decision support offering for use with relational databases. Its foundation is the HP ALLBASE/SQL relational database management system, based on industry-standard ANSI and X/Open SQL (Structured Query Language).

HP ALLBASE/SQL is included in the HP ALLBASE database management product. Available separately are HP ALLBASE/4GL, for application development, and the ad hoc query and reporting tool, HP ALLBASE/QUERY.

HP ALLBASE/SQL

HP ALLBASE/SQL is the relational part of the HP ALLBASE database management product. A relational database gives you flexibility and productivity. Instead of working on one record at a time, powerful SQL commands operate on entire sets of data at once. Instead of being limited by predefined database schema, SQL tables can be related dynamically at run-time via common columns. (A table is a set of rows and columns. Rows are analogous to records, and columns are analogous to fields.)

HP ALLBASE/QUERY

Function key access to HP ALLBASE/QUERY from within HP ALLBASE/4GL is available from release B.01 of HP ALLBASE/4GL. The HP ALLBASE/QUERY product allows novice users to perform ad hoc queries and generate reports. Developer involvement or prior knowledge of the database structure is not required because the names of tables, columns and databases are supplied as options to choose from. All screens include context sensitive help and clearly labeled function keys. Reports, queries and sequences of commands can be saved as scripts for future use.

Further Evaluation

Further information about HP ALLBASE/4GL is contained in the Technical Data Sheet.

To continue your evaluation of HP ALLBASE/4GL, you can obtain an Evaluation Pack from Hewlett-Packard and use it to create an application that meets your specific requirements. The Evaluation Pack is an HP ALLBASE/4GL Developer Pack (including the Self-Paced Training Guide and reference manuals) with a built-in time limit. Any applications you develop can be unloaded before the time limit expires and used with HP ALLBASE/4GL when you decide to purchase.

Contact your HP sales office to arrange delivery of the Evaluation Pack, or to find out more about HP ALLBASE/4GL.